THE COMMON BUTTERFLIES OF THE PLAINS OF INDIA (INCLUDING THOSE MET WITH IN THE HILL STATIONS OF THE BOMBAY PRESIDENCY)

BY

T. R. Bell, C.I.E., I.F.S. (Retd.)

(*Continued from page* 588 *of this Volume*)

Part XXXV

Sub-family (6)—Pamphilinæ

This group consists of the genera *Pamphila* with two species only found in the Himalayas and northwards to Amurland and in Burma with eleven others purely palæarctic. *Taractrocera* with eight species in British India and thirteen others in the Malayan Sub-region; *Ampittia* with two species, one Indian, one Burman; and *Aëromachus* with five Indian and two others, the one from China, the other from the Philippines; also *Ochus* with a single species from the N.W. Himalayas to Sikkim and Burma. The genera that are of interest here are *Taractrocera*, *Ampittia* and *Aëromachus* (as represented by Swinhoe's genus *Machachus*); the first of four species that come into these papers; the second of a single species and the third containing two. The species of *Taractrocera* are *mævius* (F.); *ceramas* (Hewits); *nicevillei*, Watson and *oberthüri*, Elwes and Edwards. *Ampittia* is represented by *dioscorides* (F.) formerly known as *maro* (F.)

Taractrocera mævius is an unmistakable species; *T. ceramas*, *nicevillei* and *oberthüri*, all three from S. India, are very doubtfully distinct and are probably only climatic varieties. *Machachus jhora* (de N.) and *indistincta* (M.) may possibly be different from each other.

Imago.—These are all insects of small size living near the ground where they fly over the grass and low herbage with a weak, somewhat fluttering flight, settling often and frequently with the wings more or less parted and spread, showing the upperside; especially do they do this when basking in the sun; they all effect grass lands and, even in jungle country, are chiefly found in clearing where the grass grows. They all feed upon the juices of low-lying flowers such as Vetches and small *Acanthaceæ* that are found amongst the grass. They rest at night on dead grass-stems, dry leaves and twigs, always near the ground and keep the wings closed over the back at that time. Most of the species are black or very dark brown with many grey or yellow markings on both wings on the uppersides, but *Ochus* and *Aëromachus* may occasionally be nearly immaculate. On the undersides of the wings the colours are much the same although differently disposed.

Antennæ.—These are short with a stout, blunt club without apiculus of any kind.

Palpi.—Prominent, well separated; second joint roughly scaled, third erect or conical, prominent, sometimes slender.

Fore tibiæ.—With epiphyses except in *Pamphila*.

Hind tibiæ.—With two pairs of spurs (again excepting *Pamphila* which has only one pair).

Fore wing.—Cell less than two-thirds length of costa ; vein 12 ends on costa before end of cell ; vein 5 from below middle of discocellulars ; 3 from before end of cell ; 2 from beyond middle.

Hind wing.—Vein 7 from before end of cell ; discocellulars and vein 5, faint ; 3 from close to lower end of cell, 2 from beyond the middle of cell.

Egg.—Dome-shaped, rather higher than half the breadth ; minutely pitted on the general surface, shining, with a faint cellular network of extremely fine, obscure lines (*Taractrocera*, *Pamphila*) or meridionally ribbed in *Ampittia* and *Aëromachus*. Colour very light-yellow, sometimes blotched red.

Larva.—Of normal shape, the skin translucent, showing the white tracheal tubes through or not ; body surface covered with minute, whitish, erect, simple hairs not visible to the naked eye except against the light; the head round-triangular or semi-elliptical in shape and naked ; the colour is light-green with a pulsating, dorsal, darker longitudinal line as well as lateral and spiracular whitish line or darker green with still darker dot-spots and subdorsal, dorso-lateral and subspiracular, white, longitudinal lines.

Pupa.—Moderately stout with moderate constriction at segment 5, a well-developed cremaster ending in a tiny point on each side at extremity, the free end between them fringed with simple hairs without hooks or the cremaster-end rounded and set with weak little hooked shafts ; there are well-developed expansions to the spiracles of segment 2 of various shapes ; the head has two points on the frons in *Ampittia*, a horny plate resembling a lappet in *Taractrocera* and is convexly rounded in *Aëromachus* in which genus segment 5 has a small point directed forwards on front margin in the dorsal line under which the body-string passes, the surface of the pupæ is minutely haired when examined under a strong lens. The colour is green of some shade.

Habits.—The butterflies rest with their wings closed over their backs, but bask with them partially opened ; they are all insects of grass lands and fly low down above the surface of the earth in a half-fluttering sort of way though they can go fast enough when necessary ; they do not fly for long distances and are often seen feeding at flowers growing on the ground. They sit more than fly although they occasionally play about with each other on the wing. At night they sleep close to the ground. The eggs are laid on grass-blades, on stalks and occasionally on a dead leaf, dead stalk and such like objects that are to be found amongst the grass. The larvæ live on the undersides of the blades but often go down to the roots and are rather given to wandering as is only to be expected where they cannot get away from their food. They all make cells of a kind, some cylindrical by joining both edges of the blade together at the tip or by turning over an oblong piece from the edge, or by turning over the tip at right angles to length of blade like the larvæ of many moths of the genus *Rivula* (in this case the cell is more triangular). *Ampittia* pupates quite in the open, lying along a grass stalk with tail-attachment and body-band ; *Aëromachus* pupates on the underside of a grass-blade in the hollow made by drawing the edges together but not joining them—as is the habit in the genus *Parnara*.

Genus 22.—Taractrocera.

Imago.—All small butterflies of a dark-brown colour on the uppersides, both wings heavily marked with grey or yellow spots which in some species may run into bands or even patches.

Antennæ.—Short, about half costa of fore wing ; the club short, broad, in the form flattened, concave disc.

Palpi.—Upturned ; second joint densely scaled ; third rather long and slender, erect, pointed, reaching above vertex.

Fore tibiæ.—With epiphyses.

Hind tibiæ.—With two pairs of spurs.

Fore wing.—Vein 12 reaches costa well before end of cell; upper discocellular very short, middle and lower ones erect, the lower slightly shorter; 5, therefore, from below middle and is curved down somewhat at its base; 3 from a little before lower end of cell; 2 a little before the middle; wing short triangular, costa very slightly arched, outer margin evenly convex, shorter than hinder margin; cell less than two-thirds length of costa.

Hind wing.—Vein 7 a little before end of cell, discocellulars bent somewhat inwards, faint; 5 not traceable; 3 from close to lower end of cell; base of 2 close to base of 3, hardly one-eighth removed from end of cell; costa and outer margin evenly rounded.

Egg.—Dome-shaped, shining, the surface covered with microscopical, superficial cell-like network of lines. Colour very pale-yellow, immaculate or blotched.

Larva.—Light-green covered all over with tiny darker-green dots, the bases of the microscopical hairs with which the body is covered; a dark, pulsating, dorsal, longitudinal line and signs of a subspiracular, yellowish one; a shining-black collar to segment 2. Head rather broadly semi-elliptical in shape, shallowly bilobed; surface rugose-cellular, covered with appressed, fine hairs with a large clypeus; some of the hairs round free edge of anal segment much longer than the generality.

Pupa.—Fairly stout with the front square, the eyes being prominent though rather ventral; a large semi-circular raised disc-like surface on frons; the cremaster ending in two short points with a fringe of straight hair between them instead of hooked shaftlets. Surface of body covered with tiny, erect, reddish hairs except on wings and thorax—these hairs not in any way obscuring the surface of course. Colour that of a bone, very pale-yellowish.

Habits.—Eggs laid anywhere practically amongst the grass. Larva makes a longitudinal cell at point of grass-blade by drawing the edges together. Pupates in such a cell, generally a close fit and always with some excreted cereous powder as a covering. For detail see under the species below.

The species are all Indian and Malayan. There are altogether 21 known. Of these 8 occur within the limits of British India including Burma. They are *Taractrocera mævius* (F.), *ceramas* (Hewits); *nicévillei*, Watson; *oberthüri* (Elwes and Edwards); *danna* (M.); *samadha*, Frühstorfer; *quinta*, Swinh.; *atropunctata*, Watson. *Danna* comes from the N. W. Himalayas; *samadha* from Burma; *quinta* from Burma and Assam; *atropunctata* from Burma and Hongkong. The other four all come from S. India and, for *mævius* only, the rest of India as well and Ceylon and Burma.

211. Taractrocera ceramas (*Hewits*.). (Pl. M. figs. 74 ♂, 74*a* ♀)—Male *Upperside* dark-brown with small orange spots. Fore wing with eight spots, one in the cell, three conjoined from near the costa before the apex, two in the middle of the disc and too close to the outer margin below the apex. Hind wing with two pairs of spots in the disc; one pair in the middle, the other near the apex. *Cilia* of both wings pale-brown. *Underside*: Fore wing blackish-brown, the spots as on upperside but paler and duller in colour and there is a dull orange streak between the costa and subcostal vein. Hind wing paler, markings as above but with an additional spot at the end of the cell and the entire wing more or less covered with minute, orange scales. Antennae black, the lower half of the club white at sides, the shaft with white dots: palpi, head and body concolorous with the brown of the wings; beneath palpi grey, the abdomen with obscure grey bands. Expanse up to 25mm.

The above description is taken from Swinhoe's *Lepidoptera Indica*, vol. x, pp. 116–117. He gives it quite separately from that of *Taractrocera nicevillei*, Watson, the next immediately following and says

that it is found (the species) in ' South India ' ; specifying as localities where it has been taken ; ' The type is marked Nilgiris ; we have both sexes from Ootacamund ; Evans records it from the Palni Hills, Aitken from Igatpuri; Elwes from Travancore and Malabar.' He figures the species on Plate 784, figure 2 male, 2a female and 2b the underside. In both the sexes there is a spot on the upperside of the hind wing about half way across the disc at the upper end of the cell and outside it more or less and this spot is not mentioned in the description.

Compare with the above the description of *Taractrocera nicêvillei* immediately following :—

' Male. *Upperside* rufous-brown with rather large, more or less quadrate, orange spots. Fore wing with an elongate spot at end of cell divided into two by the fold and a short adjoining streak above it ; a spot near the costa before apex divided into three by the veins ; a spot outside, its upper, inner end often touching the lower, outer end of the other spot ; two spots in the middle of the disc with two or three spots below it decreasing in size, all joined together into a discal based. Hind wing with a lunulate spot at the end of cell that is often indistinct and three discal spots, the middle one outside the others and largest, the upper one small, the lower one generally divided into two by vein 3. *Cilia* of both wings grey with an inner, dark band. *Underside* like the upper. Fore wing with the costa narrowly suffused with orange and a marginal row of obscure, dull-orange spots from apex to end of vein 2. Hind wing with the discal spots larger than on upperside, consequently all more or less conjoined ; an additional spot at the end of cell ; the wing sparsely covered with minute orange scales and indications of some obscure, small, orange spots on the outer margin. Antennæ black, ringed with white with a white patch at the base of the club beneath ; palpi grey beneath; brown above : head and body above and below concolorous with the wings ; abdomen with whitish segmental bands on the underside. Female like the male, but with all the orange spots much smaller as a rule and more separated from each other than in the male ; and, in the fore wing, the spots joined hind-wards to the two spots in the middle of the disc are often wanting.'

The expanse of *Taractrocera ceramas* is given as up to 25mm. ; of *nicêvillei* as up to 28mm.

On comparing a long series of the Kanara species, both caught and bred, it is found that these spots on the wings are very variable, they may be small or they may be large, some of them may even be entirely wanting. There is one specimen with only the very top part of the outermost discal spot on the upperside of hind wing present without a sign of any other markings whatever. On the forewing the spot in interspace 2 immediately below that in interspace 3 may be exactly equal in size to that of interspace 3 or may be larger and the spots below it may be present, quite separated from each other or they may be conjoined into a band or they may be totally wanting ; the costa may be ochreous or not, it generally is ; the marking at the end of the cell may be very bold or it may be quite small. The underside may, on the hind wing, be much suffused with orange or it may be less, the markings may be very clear or they may be blurred; the area along the hinder margin behind vein 1, that is the abdominal fold, may be very black or it may be suffused with orange. Finally, some of the orange spots may even be whitish or grey, especially on the upperside of hind wing. The *cilia* usually more or less grey above although, even there, often orange in places: while below they are orange always, although,

above and below, the brownish, basal band is there. The markings of the antennæ may be grey or orange in different specimens.

Under the circumstances, as *Taractrocera nicevillei* is from Kanara and the type is from Bombay, taken by Colonel Swinhoe, and apparently exists nowhere else and the insect is very variable in every particular that is supposed to separate it from *ceramas*, it is not likely to be specifically distinct and is probably only a local variety if it is even that.

There is still another species *Taractrocera oberthüri*, named by Elwes and Edwards from Trichinopoly, a single female; and Swinhoe states there are two males from the Anamally Hills in the British Museum. This is, according to the pictures in *Lepidoptera Indica*, much more heavily marked than either *ceramas* or *nicêvillei;* but the material upon which it was based, a single female, appears to be very inadequate in view of the variations in specimens from Kanara.

In the form *nicêvillei*, the imago has the ochreous costa of the fore wing on the upper side due to orange scales; and there are also some similar scales from base for a short way out in the cell, others forming an obscure streak along inner margin from base outwards sometimes as far as half the length of that margin; there is a fringe of fuscous hairs along the inner margin too. On the hind wing there are some longish, decumbent hairs in cell and below it reaching to about middle of disc.

The early stages of the Kanara form given as *Taractrocera nicêvillei* in *Lepdioptera Indica* are given below.

Egg.—Dome-like in *shape*, more than half as high as broad. *Surface* extremely minutely tuberculate-frosted covered with very superficial, extremely finewalled, hexagonal cells under the microscope, each cell about 0·033mm. in diameter; the whole shining. *Colour* very light yellow immediately after it has been laid; soon becoming largely red blotched, the blotching consisting of an irregular band of considerable width round the broadest part and a big blotch on apex. B : 0·8mm.; H : 0·5mm.

Larva.—This larva is rather of the *Udaspes* or *Notocrypta* type in general shape; it lies hunched with the segments 2–5 highest of the whole body; the head, however, is rather larger in proportion than in the larvæ of those two genera, the neck or segment 2 is rather thicker; the anal end has segment 13, a transverse piece of about one-third the length of 12; segment 14 is large, very broadly and bluntly semi-elliptical in shape, convex transversely and tumid round the margins, rather rough tuberculate—this segment remains intact when the skin is cast, that is it is then as broad and as long as ever on the end of the shrivelled rest; the claspers, pseudolegs and true legs are all short and rather weak, the transverse section of the body is circular from segment 2 to segment 12; segment 13 is shallower and segment 14 is flattened ventrally much more than the others and considerably over-reaches and overhangs the anal claspers. The *head* is large compared to segment 2 and is as high and broad as segment 3 at front margin; it is broadly semielliptical in shape, rather thin and has a very slight, shallow sinus on vertex; the surface is rugose-reticulate, the 'threads' of the reticulation occupying much less space than the hollows and being shining while the hollows are dull, covered with appressed, short, light, hardly visible hairs and with some much longer, erect, shining hairs about mouth opening; the true clypeus is narrow, about half the height of the face (rather less) and lozenge-shaped with the lower end truncated at labrum, the apex acute; the false clypeus broad outside it, also acute at apex, nearly mucronate, about two-thirds the height of the face; the labrum is small, transversely lozenge-shaped, reddish; the ligula is of medium size with a large triangular sinus that is both deep and broad, the colour black; the antennal basal joint is black, the second light; the mandibles are dark, the eyes black;

the colour of the head is black or very dark brown with the false clypeus soiled-white and a soiled-white, narrow band or broad line starting from the edge of the mouth-cavity and running up to the front vertex of each lobe where it is joined to another soiled-white, equally broad, straight line which has its origin on the margin of the false clypeus at the height of the apex of the true clypeus ; the true clypeus is also really soiled-white but darker than the other marks and its dorsal line only is black. *Surface* of body is dull, covered with minute, conical, brown tubercles from each of which springs an erect, fine, conical, light hair about as long as the distance between two adjacent tubercles and the distance between two tubercles is about four times the diameter of one of them ; there are a few erect hairs more than twice the length of these on each segment, but it is not sure that these are symmetrically arranged—any way there seems to be one dorsolateral on each ; on the anal segment there are a lot of still longer erect hairs all over the tumid border as well as a dorsolateral one on each side in the middle—some of these are as long as half the length of the whole segment ; each segment is transversely impressed parallel lined in the posterior half, parallel to the hinder margins as usual ; there seem to be about five such lines to each. *Spiracles* very small and nearly round, slightly raised, light yellowish ; those of segment 2 much larger and those of segment 12, perhaps, slightly smaller than those of segment 2. *Colour* of larva is light glaucous green dotted all over with darker green round dots ; a darkish purple, dorsal line and signs of a similar dorsalateral one as well as a thin, yellowish, subspiracular line ; the ventrum not glaucous ; the anal segment darkish on dorsum anteriorly ; segment 2 with a shining black collar from spiracle to spiracle ; feet whitish ; true legs very light yellowish, L : 20mm. ; B : 3mm.

The black collar of segment 2 is broken narrowly in the dorsal line, the spiracles are broadly oval ; there are about 15 rows of tubercles to one segment-length which is about 2·25mm. ; that is each tubercle is about 0·15mm. from the next.

Pupa.—The body of the pupa is cylindrical in shape, very slightly fattest in the middle, from the shoulders to segment 9 inclusive, after which it gradually thins down to the broad, blunt end, segment 13 being distinct, transverse and less than half the length of segment 12—a narrow, transverse ring—which is the same length as 11, but the pupa has the dorsal line sloping considerably from 11 backwards while the ventral line is throughout more or less straight except at the very end where the anal segment 14 is bent down somewhat and of a peculiar shape : it is very little narrower than segment 13, very nearly as long dorsally as segment 12 but very short ventrally so that its hinder face slopes in ventrally, its dorsal surface being flat (very slightly convex) and transversely broad-oblong, divided from the lateral faces by a strong, prominent ridge on each side, these ridges diverging slightly backwards and each ending in a short tooth or point, the free margin (end of pupa) between them quite straight ; the *head* is also somewhat peculiar : it is broad with the vertex fully exposed and dorsal, twice as long as the narrow, oblong segment 2 with straight margins behind it, sloping with segment 2 at an angle of about 30° to the longitudinal axis of pupa, the frons at right angles to that axis with a peculiar, circular, slightly rugose, generally black disc or plate in its centre, this plate gradually rising from the surface and free in its anterior quarter (pointing downwards), the eyes prominent and somewhat ventral ; the shoulders evenly rounded, well-developed ; the thorax with its first third with the same dorsal slope as segment 2, gradually becoming parallel to the longitudinal axis, the segment nearly as broad as long, the hinder margin a somewhat pointed quarter-circle meeting the wings in a broadly rounded angle of nearly 90° ; segment 4 about half the length of 5, thorax a little less than 4, 5 and 6 together ; the segment-margins well marked the bevilled edges of segments 8–11 flat ; the proboscis reaches free beyond the wings to the end of segment 9 ; the antennæ are short and club-shaped at ends reaching only about half way towards end of wings. *Surface* not particularly shining, with a clothing of little reddish, erect or semi-recumbent, short hairs everywhere except on the segmental membranes, wings, shoulders and a large portion of the dorsal, posterior part of thorax, head and segment 2, these hairs not obscuring the surface anywhere ; fringe of hair at posterior and anterior margins of eyes and a conspicuous row of longer, stiff bristle-like hairs along the posterior margin of anal segment that are as long as that segment itself,

about 20 or 25 in number, simple, reddish, pointing straight back. *Spiracles* of segment 2 are indicated by each a large oval, convex, red plate or rising, about as long as segment 2 is long, with a plushlike, grey bloom on the surface in certain lights ; the rest small, narrow ovals, yellowish in colour. *Colour* is yellowish dead-bone with the cremastral (anal) segment red-brown of a bright shade, the wings somewhat lighter than the general body-colour and the head and segment 2 slightly soiled. L : 13mm. ; B : 3mm.

Habits.—The egg is laid as a rule on the underside of a blade of grass ; but, occasionally, practically anywhere ; on the stem, on a dead leaf fallen amongst the grass, etc. The little larva emerges therefrom in three to five days according to weather and warmth of the sun ; it eats the shell and then proceeds to the tip of a grass-blade and makes a house by joining the edges of the leaf together, often quite a long cell for such a tiny thing. It coats the inside with silk although not very thickly and lies along the midrib. This method is persisted in throughout its life, making the house somewhat larger when big of course. It feeds, at night and in dull weather often also during the day, at first close to the cell, later wandering quite a lot. It is active and runs out of the cell sometimes, when disturbed, quite quickly ; also, if the disturbance is continued, falls to the ground and curls up, feigning death. When about to pupate, the larva makes a cell often of a withered leaf, closing both the ends with silk, one rather lightly through which the butterfly will emerge, the other tightly ; the pupa is no way attached inside and is covered with a waxy, white powder which also clothes the walls of the cell. The pupa is a close fit and the cells are often found, detached from anything, on the ground amongst the grass. Occasionally several dead leaves are used to make the pupal cell. One lot of caterpillars were obtained in October and had ceased eating by about the 25th of that month. These remained as caterpillars in a pupal cell until February 12 of the next year when they pupated. The butterfly appeared in about a week afterwards.

The head of the egg-larva measured 0·45 mm. × 0·55 mm. ; was black, shining-smooth, semi-elliptical with a single row of tiny pits along the dorsal line and sides of clypeus ; a very few erect hairs about the mouth. In the second stage the head was 0·65 mm. by 0·7 mm.; the same as in preceding stage short, erect hairs on surface; eyes glassy. Third stage 0·925 mm. by 1 mm. ; nearly black, shining, reticulate-rugose with similar hairs to last stage. Fourth stage 1·6 mm. by 1·4 mm. ; more rugose, the hairs longer, stronger, downcurved, black, about 0·05 mm. apart and as long (0·05 mm.). Final stage 1·75 mm. by 1·5 mm. with details as above described.

The food of the larva is grass of any species as long as it is not too hard and big ; rice is quite an ordinary thing to find it upon. The habitat of *Taractrocera nicévillei* is S. India and it is commonly to be found in the grassy glades in the jungles of N. Kanara District, as well as in the neighbourhood of forest both on the coast (on the hills near it at a height of 1,000′—some are not more than a mile or two from the sea-shore) and above the ghats at 1,000′ and upwards. It is probably a butterfly of heavy rainfall absent from the Plains. The insect never rises high off the ground, is not very

partial to sunlight and may be found flitting just above the tops of the grasses settling at frequent intervals on a blade or stem, often even on the bare ground ; frequently in the basking position with the front wings slightly opened, the hind wings more opened still. Two individuals will often play with each other in the air, circling at a low elevation within a small area ; the ordinary flight is of the usual skipping or jerking variety from which the family has got the name of Skippers.

The figures of the male and female, No. 74 and 74*a* respectively on the coloured plate M are quite good but as usual a trifle too red.

212. Taractrocera mævius (*F.*)—(Pl. M., figs. 76, 76*a*).—Male. *Upperside* olive-brown with white markings. Fore wing with a short streak on and above the median vein (the bottom of the cell) in the middle of the cell ; another above it at upper end of cell with two (or one) short streaks between it and the costa, sometimes connected together ; a series of spots in two parts across the disc, three conjoined from the costa near the apex in interspaces 6, 7 and 8 and four commencing with one near the base of interspace 3 separated by the vein from another nearly in the middle of interspace 2 separated again from the third and fourth that form an inwardly oblique band in the two interspaces below ; these last four spots quadrate and slightly excavated on outer side ; two more spots beyond towards margin in interspaces 4 and 5. Hind wing with a series of small spots in almost a straight line in the middle of the disc, four in number in interspaces 2, and 4, 5, the latter slightly outwards ; another above and further in in interspace 6 and two at end of cell ; the ones at the end of cell and the other single, uppermost spot may be extremely faint at times. *Cilia* of both wings grey with white tips, more prominently white towards tornal angle of fore wing and in hinder part of hind wing. *Underside* with the colour similar, almost as dark as on upperside with the markings similar but, on the hind wing, there is a bar across end of cell and spots in interspaces 6 and 7 beyond. Antennæ black ringed with white, the club with a white basal patch on underside ; head and body concolorous with wings ; abdomen with white, segmental bands.—Female. *Upperside* like the male but somewhat paler, the spots larger and more prominent. *Underside* with the markings as on the upperside. Fore wing with the costal and apical portions whitish, the veins below the costa and at the apex white ; a narrow, white outer, marginal band and a black, marginal line. Hind wing entirely suffused with white, all the veins pure white. Expanse up to 27mm. or slightly more ; the males smaller (Swinhoe, *Lepidoptera Indica*).

In a large series bred in the Dharwar District, Bombay Presidency, there is a short ochreous band of scales from base of fore wing along the costa over cell and a very pale blue scale-band along the inner margin from base to half way with another, shorter, above vein 1, and there is a sparse fringe of grey hairs along inner margin. On the upperside of hind wing there are some long, grey hairs decumbent in cell and more numerous ones below cell from base to quite three-quarters way to outer margin. Underneath on both wings there are ochreous scales, the hind wing being covered with them ; all the veins have white scales along their whole length on the hind wing and apical portion of fore wing ; the abdominal fold of hind wing is sprinkled with white scales only. The hairs of the patagia are tipped with yellow where they abut on the costal yellow band of fore wing, the palpi are clothed with brown and yellow scales above ; the third joint being black. Numbers of the females have the spots on fore wing yellowish, all the males have them white.

Egg.—Dome-*shaped*; rather higher than half the breadth. *Surface* is shining somewhat, covered with a network of lines under a strong lens under the microscope they are minute, thin-walled, low cells of about 0·025mm. diameter; on the top is a smooth space; circular, darker than the rest. *Colour* that of a dry bone. B : 0·925mm. ; H : 0·6mm.

Larva.—The *shape* is that of any of the genera *Telicota*, *Halpe*, etc. The head rather small for the larva though, as usual, large for segment 2; on the whole body is thickest about middle though little thicker there than at segment 4 or segment 11; the anal flap is large and a short semi-ellipse in shape, overhangs the anal claspers by a considerable amount, is flattened a good deal on the dorsal aspect, is not particularly thickened round the edge and is quite as broad as segment 13 for half its length; segment 13 is a transverse band about one-third the length of segment 12. The *head* is a little broader than segment 2 and a good deal higher, somewhat deeply—though not very considerable—bilobed, the lobes somewhat moderately broadly rounded, the sinus on vertex separating them triangular and inclined to be broad; the general shape is more than half a short ellipse; the face is moderately convex; the clypeus is large, reaching more than two-thirds of the height of the head—this may be the false clypeus and then the true clypeus is not distinguishable easily—and the sides of the clypeus are outwardly somewhat convexly-curved; the surface is finely honeycombed-rugose and covered with minute, short, simple hairs which are only visible under a lens, the colour is black-brown with the false clypeus outlined somewhat diffusely and not very narrowly soiled yellow-white; inside this, again, the true clypeus is triangular, higher than broad by a good deal (perceptible as clypeus in certain good lights I see now) and may be outlined also thinly soiled yellowish-white; besides these markings there is a similar white band running up the face parallel to the central or dorsal line, subdorsal on each side to vertex of each lobe where it turns sharply down again to nearly reach the eyes separating the face from the cheeks; the subdorsal band does not go further than the upper part of the white bordering of the false clypeus; there is a soiled yellow-white, rather large spot below and behind the eye curve; the labrum is very narrow and not long, glassy in colour; the ligula roundly kidney-shaped and soiled red-brownish; the antennal joints light; the mandibles dark-tipped; the eyes dark. The *spiracles* are small, roundish, light brownish-yellow, those of segment 2 oval and much larger, those of segment 12 only slightly larger : all very slightly raised. *Surface* of body is dull, covered all over with minute, short, erect, simple hairs with a few on each segment slightly longer; the hairs round the anal flap-edge much longer, especially some four or six of them, light in colour. Colour light opaque-looking yellowish-green with a dark-green, pulsating dorsal line and a lateral less dark-green shade. L : 20mm. ; B : 3mm.

The transverse, thin, impressed, parallel lines towards the hinder part of each segment are also here as usual. Segment 2 has a broad-linear, shining, chitinized, black collar from over spiracle on one side across dorsum to the same place over the opposite spiracle. Ventrum green; prolegs ditto; true legs shining green with black extreme tips. The body colour is punctuated, so to speak, by little darker green dots which indicate the bases of the little body-hairs; segments 2, 3, 4 have these dots still smaller and blackish.

Pupa.—It is somewhat of the *shape* of those of the genera *Halpe*, *Telicota*; rather long and slim with the front end broadly blunt and very slightly convex, the anal end narrowly blunt, the sides parallel, the shoulders slightly broader than the head and the segment 2 (which are of the same breadth one as the other), a very slight constriction between shoulders and head; the breadth the same practically from shoulders to segment 8, afterwards thinning very gradually to segment 11, more rapidly, then, to anal extremity; segment 13 a complete band, half the length of the segment 12; the cremastral segment transverse oblong a little longer than segment 13, the posterior side (extremity of pupa) rounded and ledge-like between the posterior corners which are each thickened (with the lateral side) and produced out backwards into a short, conical pointed tooth, the two teeth diverging from each other or from dorsal line of pupa; underneath this ledge, indeed from ventral surface thereof, proceeds a fairly dense fringe of simple hairs all along its length, these hairs golden orange and directed straight backwards and all about the same length as the segment or nearly as long; the *head* frons is perpendicular to the

longitudinal axis of the pupa and very slightly convex with, at its lower edge, in the dorsal region, a curious little lappet which covers the base of the ligula: this lappet shaped like three-quarters of a circle and free (though, of course, rigid) round the edge (the rounded part) though continuous with frons at base (the base or origin, the upper or posterior part), the breadth of this lappet about half that of the whole frons, though only one quarter of the whole breadth of front of pupa; the vertex of head short, slightly inclined towards longitudinal axis of pupa and composed of an anterior simple half and a posterior half divided into two lateral, oblong strips, one on each side of dorsal line continued to the base of antennæ on each side and coming to points where they meet in the dorsal line—which is all, both the lappet and these strips, a characteristic arrangement or development; thorax with the front margin straight, the whole segment evenly rounded, of moderate length, the front slope at about 30° to longitudinal axis, the apex or highest point about the middle of the segment with a very slight and gradual fall to the hinder margin which is a parabolic curve with somewhat excessively diverging arms (or an equilateral triangle with the apex broadly rounded) meeting the wing lines in a broadly-rounded angle of about 45° so that segment 4 is largely exposed in the lateral region on each side though of normal length in the dorsal line; the proboscis reaches free beyond the ends of wings as far as the posterior margin of segment 9 and beyond to the middle of segment 10. *Spiracles* of segment 2 large, longly oval, considerably convex bodies or surfaces on the front marginal surface of segment 3 which is gently produced forwards for the purpose of accommodating them: the colour being golden-orange-brown; all the other spiracles are very small and oval, slightly raised and light brownish-yellow in colour. *Surface* of pupa dull, slightly and finally aciculate-scratched transversely and covered very sparsely with small, short, erect, reddish, pointed hairs, these hairs (none of them are easily seen except with lens) longer and stronger on the upper and lower 'eyelids,' less strong laterally on posterior and anterior thorax, laterally on segment 4 and ventrally on the lateral portions of abdominal segment, especially segment 14. The *colour* is livid very light yellow—the colour of a fresh bone, the lappet on head-frons brown, the tail points and ledge red-brown. L: 13 mm. B: 3 mm. The pupa is covered with a slight cereous powder; white.

Habits.—The eggs are always laid singly on the blades of grass, either on the upper surface or on the under. The little larva eats the shell completely and immediately proceeds to make a cylindrical cell either at the side of the blade by turning over the edge or at the tip by doubling the leaf and fastening the edges together. The cell always is a tight fit for the larva and is only changed when necessitated by the gradual growth. The growth is not rapid. Eggs were laid at the end of July and beginning of August; on August 4 there were some small larvæ on the grass; none of these pupated until September 4 so that one month is about the period for complete growth. The pupation takes place in a tight cell made of a blade or blades of grass which is close-fitting and well-closed; the grass may be withered or not but not dry and hard. Practically any grass is eaten by the larva. The butterfly is common in Dharwar in the grass-lands round about. It is found also locally below-ghats: in Bhatkal near the coast and round Gokarn. Not seen in Karwar. It flies low and rather weakly over the grass, resting often on the ground or on a low leaf, basking in the sun with its wings half open; it rests at night amongst the grass or under the shade of bushes on their leaves; it visits flowers frequently and never flies very far at a time, nor high. It is not scarce in the grass lands on the open country above the Western Ghats. Swinhoe gives its habitat as India, Ceylon and Burma.

The distribution he gives as follows :— ' In our collection from Mhow ; Poona ; Ranikhet ; Maymyo, Upper Burma and Trincomali in Ceylon ; recorded by Elwes from Sikkim ; Calcutta and Ganjam ; by Hannyngton from Kumaon ; by de Rhé-Philipe from Lucknow and Masuri ; by Aitken and Comber from the Konkan ; by Fergusson from Travancore ; by Moore from Kangra ; by Doherty from Kumaon and by Adamson from Toungoo and Moulmein ; it is widely spread all over India, Burma and Ceylon but is very local.'

The figures of the male and female butterfly on Plate M, numbered 76 and 76*a* respectively are not bad ; but, again, they are much too red ; the underside of the hind wing of the male should have the veins white as well as the spots.

Genus 23.—Ampittia.

Imago.—Small butterflies of the aspect of *Taractrocera* but the males with the yellow developed into large patches divided into large conjoined spots by the black veins ; the undersides of hind wings more yellow with black spots than black (or brown) with yellow spots and the abdominal fold concolorous with the rest, not blackish as in *Taractrocera*. There are two species, one *dioscorides* (F.) and *maroides*, deN. The latter is from Burma and Perak and is not easily distinguishable from *dioscorides*, if it is, indeed, a different species.

Antennæ.—Short, about half the length of costa of fore wing ; the club moderated, straight, blunt.

Palpi.—Upturned, densely clothed; third joint erect, its tip, which is bluntly conical, reaches over vertex of head.

Fore tibiæ.—With epiphyses.

Hind tibiæ.—With two pairs of spurs.

Fore wing.—Vein 12 reaches costa well before end of cell ; upper discocellular very short but distinct in almost a straight line with the middle and lower, the last somewhat shorter than the middle one, vein 5 therefore slightly nearer 4 than to 6 ; vein 3 from a little distance before end of cell in the male, from close to end in female ; 2 from a little beyond middle ; cell less than two-thirds the length of costa, shaped like an elongated triangle, lower margin somewhat inwardly curved from base of 2, bent upwards from 3 to the end. Wing short and broad ; costa very nearly straight, apex angular ; outer margin very convex, a little shorter than hinder margin. Male with a short, glandular streak on upperside immediately below origin of vein 2 but not touching either 2 or 1.

Hind wing.—Vein 7 emitted one-third from upper end of cell, curved up at its base, the outer margin of cell inwardly curved from origin of 7 to end which is rounded ; discocellulars faint ; 5 not traceable ; 3 from very close to end of cell ; practically touching it ; 2 from less than one-fourth before end ; costa and outer margin evenly rounded.

213. Ampittia dioscorides. (*F.*)—Male. *Upperside* bright golden-yellow ; costal line black, after margin with a broad, even, black band, very slightly but squarely bulged inwards at the hinder angle ; a broad, black band on the hinder margin with two golden-yellow spots in it, one a little before middle, the other a little beyond middle ; a black band running up from the middle of hinder marginal band to costa one-third before apex, throwing out a cross-band from above its middle and joining the marginal band ; in some specimens this discal band is disconnected from the costa from the cross-bar. Hind-wing blackish-brown with an irregular-shaped, short, broad, discal, golden-yellow band, composed of spots divided by the veins, the two central ones elongated, the lower ones small. *Cilia* brown, touched in parts with golden-yellow, especially at anal angle. *Underside* : Fore wing as above but the extreme outer margin is more or less golden-yellow. Hind wing with the ground-colour golden-yellow, most of the wing covered with minute, brown scales ; the discal patch as above, edged with pale-brown and a series of pale-brown, submarginal spots all round the wing from base to anal angle. Antennæ black ringed with yellow ; the club yellow on the underside and at

tip ; palpi, head and body brown above, palpi and head marked with yellow ; beneath all yellow.—Female. *Upperside* : dark-brown. Fore wing with a yellow spot at end of cell and a discal series of yellow spots ; two, sometimes three, divided by the veins, from near the costa one-sixth from apex and two in the middle of the disc in interspaces 2 and 3 with another small, in interspace 1 ; an indistinct series of submarginal, yellowish spots on upper half of wing. *Underside* : paler. Fore wing has the spots as above, but larger ; a yellow, subcostal streak from base to beyond middle. Hind wing with many minute, yellow scales in parts, a discal series of yellowish spots and a submarginal series. Expanse up to 25mm. (Swinhoe, *Lepidoptera Indica.*)

The description is not very good. In bred specimens there is, on the upperside of fore wing in the male, an orange streak along the inner margin, and a streak above it from base to one-third of the way out instead of a broad, brown band ; there is also a thin orange line parallel to outer margin in the middle of the broad marginal, brown band reaching from costa just before apex to vein 4; the *cilia* have orange brown interspaces as broad as the orange ones at ends of veins, the basal half all brown. There is a brown fringe of hairs along the inner margin. The antennæ have the club with a dull-orange tip ; on the hind wing upperside there are some long yellow hairs in the cell, decumbent and a line of similar ones along vein 1. *Underside* : hind wing orange with a series of brown, largish spots between the veins just inside the margin, all of them powdered with orange scales ; the discal orange markings of upperside showing through and outlined by brown powdered with orange scales ; a large brown spot in interspace 7 and a somewhat smaller one above it in interspace 8, the absolute base of wing also brown. In the female all the male markings are present but so reduced in size as to give the insect the appearance of a *Taractrocera nicevillei* ; and they are more yellow than orange. The males are really very like *Padraona gola* to look at.

Egg.—The shape is that of a dome, rather unusually high. *Surface* shining and sculptured with 24 meridional ridges from base up to more than three-quarters the height where they lose themselves ; the top obscurely, minutely reticulate-lined, even slightly concave. *Colour* light-yellow becoming light-green some time after it is laid. B : 0·9 mm. ; H : 0·6 mm.

Larva.—Of the usual *shape*, thickest in the middle, fining to both ends ; circular in transverse section except head and anal segment ; the latter rather longly semi-elliptical, sloping at about 30° to longitudinal axis of body and somewhat flattened ; the head about as broad as middle of segment 3, broader than segment 2 and slightly higher. *Head* nearly round but slightly higher than broad with a triangular clypeus which is higher than broad, reaches more than one-third way up the face ; outside it is the false clypeus reaching more than half way up, also triangular and slightly curvilinear, the sides convex outwards ; the apex acute ; the surface is shallowly cellular-rugose, covered with extremely short, erect white hairs, all of the same size or length and light in colour ; only visible under a lens and then only when looked at sideways ; the labrum, ligula and antennal joints and the ground colour of the head rather soiled yellowish white with two reddish longitudinal stripes on each lobe and yellowish white mandibles with dark-brown tips ; eyes dark and light : some the one, others the other. *Spiracles* soiled white, small, broadly oval, somewhat convex, those of segment 2 much larger, those of segment 12 a little larger. *Surface* as usual with this type of skipper, covered all over with minute, erect, rather densely disposed hairs which are white in colour and all of one length, visible only under the lens ; those on the anal segment reddish and more visible, those round the margin of that segment a good deal longer and white. *Colour* grass green with a broad longitudinal, subdorsal, white stripe, a dorsolateral and supraspiracular, narrow white band

or line and a spiracular, thin, yellowish line ; the true legs, ventrum prolegs green ; the whole dorsal surface (as distinguished from the ventral) slightly glaucous except the dorsal broad line which is the only really grass green part. L : 22mm. ; B : 3mm.

There is a small, deep-black dot or spot dorsolaterally on segment 2 which is the only mark of any importance besides the longitudinal white stripes already mentioned in the description above.

Pupa.—A little, green pupa formed on the stem low down, the head always pointing down. It is abnormal in having a short frontal process on each side of dorsal line of the *head* which springs from the dorsolateral region and is directed out sideways in front of the eye the upper hinder margin of which it just over-reaches ; it is directed also slightly forwards away from the frontal surface and is triangular flattened anteriorly and posteriorly, with somewhat broken edges, and the outer surface is roughened : the two together, seen from above, looking like a short pair of horns with a wide sweep. The *shape* of the pupa is nearly circular in transverse section from the thorax to segment 13, the ventrum slightly flattened, the greatest breadth at the shoulders whence it gradually thins to the strong, triangular, broadly round-topped, somewhat down-curved cremastral segment which is nearly as long as segments 11, 12 together, rather thin through with the dorsum mostly occupied by a longitudinal depression which is triangular in transverse section : the suspensory hooklets small and at the extremity spread out fan-wise ; the highest point is the apex of the thorax whence (from just behind the shoulders) the dorsal slope to frons is a straight line at an angle of about 45° to the longitudinal axis of the body ; the head-vertex forms the front base of this slope, and it has its hinder margin curved convexly towards segment 2 ; segment 2, immediately following it is about the same length, with its hinder margin straight ; the thorax is smoothly rounded, rather humped, the shoulders hardly at all prominent, the hinder margin of the segment a more or less parabolic curve meeting the wings in a rather broad, deep, rounded angle of somewhere about 44° ; segment 4 in dorsal line slightly shorter than segment 5 ; segment 13 very short ; segment 12 half the length of segment 11 ; the proboscis alone but none of the legs or antennæ reaches the ends of the wings. *Spiracles* of segment 2 are indicated by, each, a rather large, very slightly-raised, flat, opaque-white, semicircular space on the surface of segment 3 immediately behind each ; the rest are small, nearly round, slightly raised, yellowish. The *surface* of the pupa is shining, very finely and shallowly transversely aciculate and granulate, perceptible only under the lens—except the frontal processes which are as above described. The *colour* is grass-green, light and slightly glaucous, with the white markings of the larva ; the thorax, head and wings hardly glaucous ; there is a minute lateral and dorsolateral, shiny-smooth dot just behind the front margin of segment 2. L : 26mm. ; B : a little over 3mm.

Habits.—The butterfly lays its eggs singly upon the leaves of the rice. The little larva eats from the edge of the leaf and lives in a cell made at first by joining the edges of the leaf at the point, when more grown by turning over the top of the blade at right angles to the length of it, coating the inside with silk. Pupation takes place in the open ; the pupa is attached, head down, by the tail and a body-band to a rice-stem just over the surface of the water. Twenty-five eggs were dissected out of a female. The butterflies are generally found round the rice-fields in Kanara in the monsoon months but also elsewhere in open spaces where there is grass. The larva was first discovered in N. Kanara District on rice and the first pupa was also found in a rice-field in the position just noted. That was in the year 1894. Many more butterflies have been bred since those days and the pupa always is formed along a stem in the same way even when there is no water. They are weak fliers and flit about over the rice in much the same way those of the genus *Taractrocera* do over grass ; sitting in the same way to bask on the leaves with the wings partly open to the sun. At night they rest

with them closed over the back. The habitat is given by Colonel Swinhoe as Sikkim, S. India, Ceylon, Burma, Malacca, Annam and Sumatra (*Lepidoptera Indica*, vol. x, p. 126; figures are given on Plate 786 of the male upperside No. 1, male underside No. 1*b*, female upperside 1*a* and underside 1*c* together with larva and pupa No. 1*d*); the distribution is alluded to as follows :—'The type of *dioscorides*, a female, came from Tranquebar and is in the Museum at Copenhagen; the type of *maro*, in the Banksian cabinet in the B.M. from Ceylon; we have both sexes from Hue, Annam; Trivandrum; Madras and Ceylon; Evans records it from the Palni Hills; Fergusson from Travancore; Betham from the C. P.; Watson from the Chin Hills, Beeling and Pegu; Moore from Mergui and Ceylon; de Nicèville from Sikkim; Davidson, Bell and Aitken bred it in Kanara; we give copies of Davidson's original drawings of larva and pupa.' He says positively that there is no difference between *dioscorides* and *maro*.

Genus 24.—Aeromachus.

This is divided into two by Swinhoe; one genus he calls by the original name and reserves for those species that, in the male, have a sex-mark; the other he has christened *Machachus* for those which have none. The only species that concerns us here comes into this latter. Swinhoe has two species of *Aëromachus* named *stigmata* (M.) and *dubius* (El. and Ed.), the former from N. W. Himalayas, Sikkim and Assam; the latter from the Palni Hills, Peermade, Travancore. In *Machachus* he places three called *jhora* (deN.), *kali* (deN.) and *indistincta* (M.) from, respectively, Sikkim, Assam and Burma; Sikkim and Burma; S. India, Ceylon, Burma, Java, Sumatra.

Imago.—These are the smallest of Indian Skippers, varying from 20mm. to 25mm. in expanse. They all have the uppersides of both wings immaculate brown except for, in some, on the fore wing, a postdiscal series of always small, whitish dot-spots between the veins from interspace 2 to interspace 8, this series forming an absolutely even curve. The undersides are generally somewhat lighter with the postdiscal series of spots showing through and a similar series on the hind wing.

Antennæ.—With the club robust, blunt (at least in the Kanara species understood to be *jhora* from Swinhoe's description) at the end, although conical.

Palpi.—With the second joint pressed closely against the face, third joint porrect, not particularly short, conical.

Hind tibiæ.—With two pairs of spurs.

Fore wing.—Vein 12 ends on costa before end of cell; 5 from below middle of discocellulars, 3 from before lower end; 2 from about one-third before end; cell less than two-thirds length of costa; costa slightly, evenly curved; apex well pronounced; outer margin convex and shorter than hinder margin.

Hind wing.—Vein 7 from before upper end of cell; discocellulars and 5 faint; 3 from close to lower end; 2 from beyond middle.

Egg, larva, pupa, habits.—See below under *jhora*, the only species for which they are known.

214. Aeromachus jhora, *Swin.*; **indistincta** (*M.*).—*Upperside*: uniform olive-brown without any markings; in some individuals there are faint indications of some discal and submarginal markings. *Cilia* concolorous with the wings, the tips paler. *Underside* paler; a small whitish spot at end of cell, sometimes absent; an indistinct, whitish, outwardly-curved, discal band, thin and from near the costa half way down the wing; the upper and outer portions of the wing covered with minute, white scales. Hind wing entirely covered with minute, white scales; traces of a whitish, outwardly-curved, discal band, a very faint series of submarginal spots a little darker than the ground colour. Antennæ black, ringed with white; the club whitish on the underside, all except the tip; palpi, head and body above concolorous with the wings, whitish on the underside. (Swinhoe in *Lepidoptera Indica*, vol. x, p. 196. Figures are given on Plate 802 of the same book, No. 5 of the male, 5*a* of the female, 5*b* of the underside).

Egg.—The *shape* is that of a somewhat elongated hemisphere or dome. *Surface* is shining, minutely pitted under the microscope and having 19 meridional tuberculate ribs which do not reach the bottom and lose themselves at about two-thirds the way up in knobs ; these ribs have the intervals between them cross-rayed, the intervals between the cross-rays being 0·02mm. ; the ribs are 0·01mm. thick and the greatest breadth between them is ten times that or 0·1mm. (this is of course at their lower ends) ; there are four tiny tubercles to each 0·05mm. length of rib. *Colour* slightly soiled-whitish or very pale honey-yellow with, sometime after laying, an irregular, blotchy, blood-red band round the middle and some separate ring-spots, also a patch on vertex made up of ring-spots and blotching of red. B : 0·65mm. ; H : 0·4mm.

Larva.—Is very similar to those of *Ampittia dioscorides*. The caterpillar's *head* is half-elliptical in shape, higher somewhat than broad with the surface rough-cellular and some hairs about the lower part round mouth-opening, the colour being green with yellow mandibles. The *shape* of the body is subcylindrical, thickest in middle or about segment 5 when at rest ; segment 2 not as broad as head, the neck still narrower ; anal end flattish, broadly rounded at extremity with some hairs on the free margin. *Surface* dull, under the lens covered with minute, erect hairs ; the segments all well marked. *Spiracles* very small disc-like, yellow, very round ; those of 2 much the largest. *Colour* light-green, glaucous-looking with darker green dots, the hair-bases ; a darkish dorsal, longitudinal line, a white, lateral, distinct, longitudinal line and an indistinct, subspiracular one ; two yellow bodies, one on each side of dorsal line, showing through the skin in the male. L : 19mm. ; B : 2.5mm.

Pupa.—Much the same *shape* as that of *Ampittia* ; the head square in front, eyes prominent, the frons with a short beak or conical boss or snout, porrectly pointing out in front ; thorax convex-humped ending somewhat abruptly behind ; segment 2 long, convex transversely, less inclined to the longitudinal axis of the body than front of thorax ; no constriction at 5 ; under the lens segment 4 is somewhat lower than 3 and 5 is again ever so little higher than 4, the front margin being provided in the dorsal line with a little point that is directed over 4 and under which passes the body-band that serves to keep the pupa against the surface it is fixed to by the tail ; wings very little thickened along inner margins behind the rounded shoulders ; the outline is straight on dorsum from thorax-end to cremaster ; circular in transverse section from shoulders to 13 ; segments 13 and 14 are exactly the same width to end of cremaster which is a thin, oblong piece with the extremity rounded and set with fine, white hairs. *Surface* set with extremely minute, erect hairs under the lens ; segments distinct. *Spiracles* small, oval, whitish, that of segment 2 with a rather large, broad, flush, yellow mark like a note of exclamation. *Colour* dark, semitranslucent green with a fine subdorsal and lateral, longitudinal, white line and an obscure spiracular one. L : 14·2mm. ; B : 2·9mm. ; snout 0·1mm. long.

Habits.—The eggs are laid on dead blades of grass or green ones, generally on the undersides. The larva makes a loose cell by joining the edges of the blade in a slovenly way, lying on the underside of the blade. It pupates in an open cell similar to those *Parnara* makes by just drawing the edges of the blade together but not joining them. The pupa is attached by the tail and a body-band. The hairs at the end of the cremaster of the pupa must have minute-hooked tips to fasten into the silk-pad. The butterflies are weak fliers, frequenting grass in the open places in the jungles but are difficult to see owing to their small size and to their comparatively fast flight. They rest on the ground or on leaves, etc., close to it ; never rise any distance from it and are fond of flowers upon which they feed, choosing such as grow amongst the grass, mostly leguminous. As a sort of example of the vicissitudes that attend the pursuit of breeding butterflies in India the following extracts from a diary of 1918 may perhaps be of some interest :—

Monday, September 9.—A dull morning ; it had been raining all the night

Walked and bicycled down the 1,500′ to the foot of the Gund Plateau and the remaining twelve miles or so to Sulgeri on the Kalinadi River. Collected various plants. . . . After we got in to the bungalow we went down to the river and looked in the grass for *Aëromachus indistincta* and after a bit, found there were a lot of them about—they are so small that, at first, before we became accustomed to them, we hardly saw one ; they fly fast and in long jerking, deviating way ; settling rather rarely except occasionally on flowers in the grass ; they do not often sit. Later on about 1 or 2 p.m., however, they settled much oftener and M. managed to catch three after vain efforts with a tumbler and a finger bowl, stalking them with great care and popping the thing over them on the ground. The servants brought no butterfly net with them so I sent back for one and a cage and to-morrow we hope to get a lot to breed from.

Tuesday.—After breakfast went out with the net that had arrived and managed to catch seven *Aëromachus* to put in the cage with grass for them to lay on. Hope to catch more to-morrow. The catching of these butterflies and determining plants took us until tea-time after 4 p.m.

Wednesday.—Got back to the bungalow at about 11 a.m. and found. Ibrahim had caught two *Aëromachus*. He had taken all the morning over it. So we set to work and caught fourteen in half an hour which we put into the cage. Then we had breakfast sandwiches, hard-boiled eggs, buns and cold coffee. After which we packed up everything. It was after 1. Went to Kadra in the afternoon.

Friday 13.—In the evening examined all the grass in the cage in which we had put the *Aëromachus*. They were all dead except one. There were, however, eight eggs laid by them. Leaving Karwar to-morrow for Dharwar and shall take an egg to describe ; leaving the others to be looked after here by Taku and Waman.

Thereafter Dharwar, Poona, Bombay, the influenza epidemic and a bad attack of that followed by dysentery brought the time up to November 20. On October 10 or about that date two or three butterflies of *Aëromachus* came out of pupæ resulting from the eggs laid in September No more ; for Waman and Taku, the boys looking after breeding operations in Karwar, had got influenza and, although not badly, they were so frightened because of the reports of deaths everywhere in the Presidency that they neglected everything and, it appears, stayed at home in the village, lying down.

In the specimens caught that September and other captured since in N. Kanara District, many have the discal series of white scale dots on the fore wing (they are not semihyaline at all) very distinct while others have it absolutely wanting ; some have a white dot at the end of cell on the upperside of fore wing also. On the underside of the fore wing the discal series consists of one each in interspaces 1 to 8, the one in the first being sometimes hardly visible—on the upperside there are generally only the last 5 ; there is an indistinct series, submarginal, of three spots in interspaces 5, 6 and 7 : in the hind wing, similarly, the discal series consists of one in each of the same interspaces 1 to 8 with a submarginal series of 5 and a single one at end of cell. The fringe of hair along inner margin of fore wing is very slight ; the long decumbent, brown hairs in cell on upperside of hind wing and below cell are also very few.

Swinhoe informs us that the habitat of the butterfly is S. India, Ceylon, Burma, Java and Sumatra and that the type came from Salween, Moulmein, that Moore records it from Mergui ; Elwes from Bernardmyo, Tavoy in Burma and from Java ; de Nicéville and Martin from Sumatra ; Adamson from Toungoo ; Hampson from the Nilgiris, de Nicéville from the Palni Hills, Davidson, Bell and Aitken bred it at Karwar but unfortunately did not figure the larva and pupa ; and that he has it in his collection from the Ataran Valley in Burma and from Sumatra.

There are seven extra Indian species of the genus *Aëromachus* coming from Japan, W. China, Amurland (*inachus*, Ménétriés); from Thibet (*catocyaneus* Mabille) ; from Moupin, E. Thibet (*piceus*, Leech) ; W. China (*chinensis*, El. and Edw.) ; W. Java (*javanicus*, El. and Edw.) ; the Philippines (*musca*, Mabille) ; and from Shanghai, Ichang (*nanus*, Leech.)